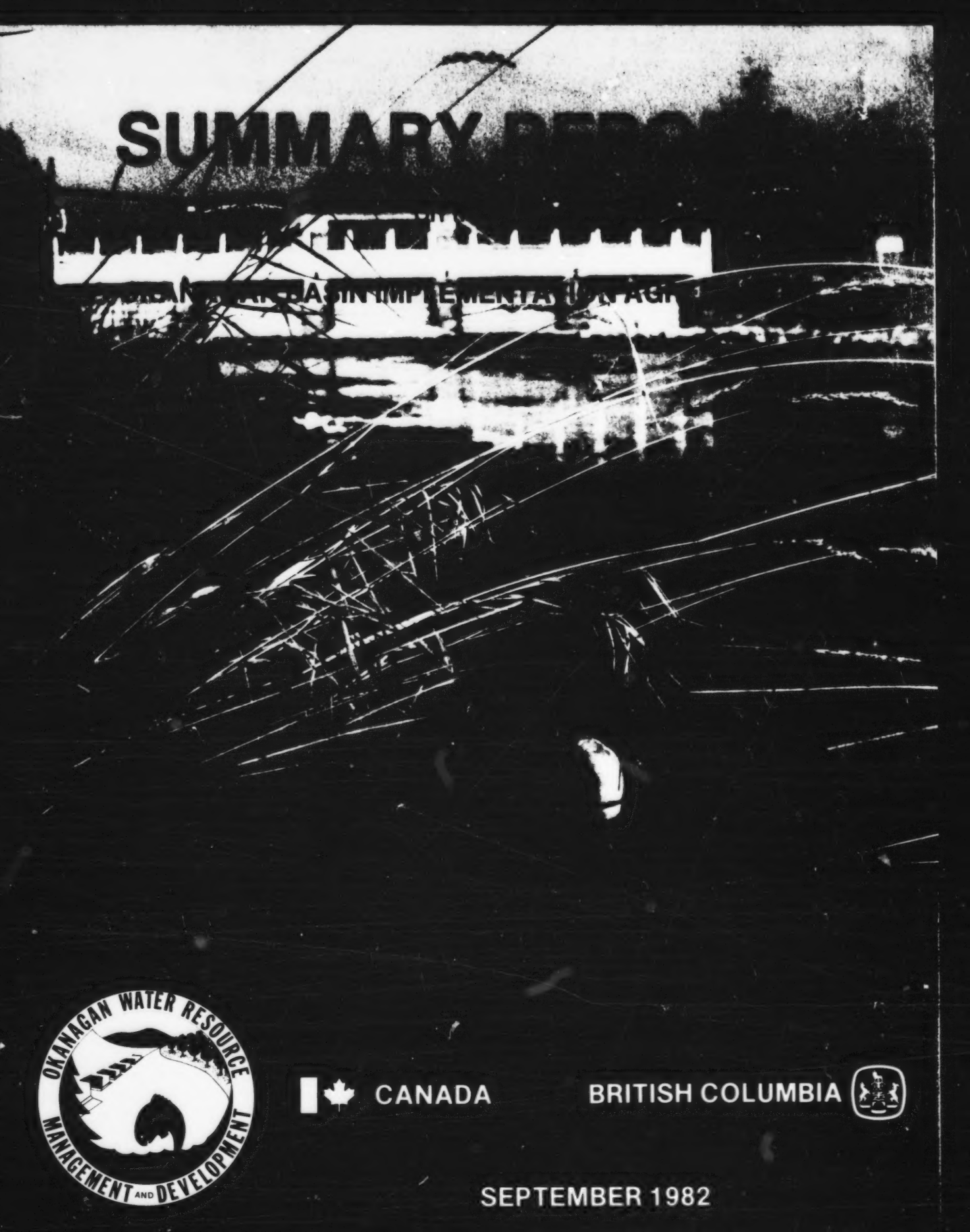

SUMMARY REPO

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OKANAGAN WATER RESOURCE MANAGEMENT AND DEVELOPMENT

CANADA

BRITISH COLUMBIA

SEPTEMBER 1982

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Enquiries for copies of this publication
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SUMMARY REPORT
on the
OKANAGAN BASIN IMPLEMENTATION AGREEMENT

SEPTEMBER 1982

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OKANAGAN
BASIN
IMPLEMENTATION
BOARD

CANADA
E.M. CLARK, VICE-CHAIRMAN
B.A. HESKIN

BRITISH COLUMBIA
T.H. OXLAND, CHAIRMAN
T.F. MOORE

LETTER OF TRANSMITTAL

September 1982.

The Honourable John Roberts,
Minister of the Environment,
Ottawa, Canada.

The Honourable Stephen Rogers,
Minister of Environment,
Victoria, British Columbia.

Dear Sirs:

On February 9, 1976, the Governments of Canada and British Columbia entered into a joint undertaking to implement a plan for the development and management of water resources in the Okanagan Basin. This undertaking was designated as the Okanagan Basin Implementation Agreement. The "Parties" to the Agreement subsequently each appointed two members to form the Implementation Board. This Board was made responsible for the implementation and administration of the various cost-shared programs referred to in the agreement, and for maintaining coordination with other departments and authorities responsible for non-cost shared programs. The time frame of the Agreement was for five years, to February 9, 1981. This time frame was subsequently extended to September 30, 1982.

The Implementation Board is pleased to submit the Report on the Okanagan Basin Implementation Agreement which includes recommendations for the ongoing management of water and related resources in the Okanagan Basin through 1980. A summary of this report is also enclosed.

The Board wishes to express its appreciation for the support it has received from the Governments and their representative agencies.

Respectfully submitted,

"E.M. Clark"
E.M. Clark, Vice-Chairman
Regional Director,
Inland Waters Directorate,
Environment Canada.

"T.H. Oxland"
T.H. Oxland, Chairman,
Regional Director, Okanagan Region,
Ministry of Environment,
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Regional Director,
Environmental Protection Service,
Environment Canada.

"T.F. Moore"
T.F. Moore,
Assistant Deputy Minister,
Ministry of Municipal Affairs,
British Columbia.

TABLE OF CONTENTS

Page

Letter of Transmittal ... i

Table of Contents ... ii

Okanagan Drainage Basin (Figure "A") ... iii

Introduction ... 1

Highlights of the Plan Review ... 2

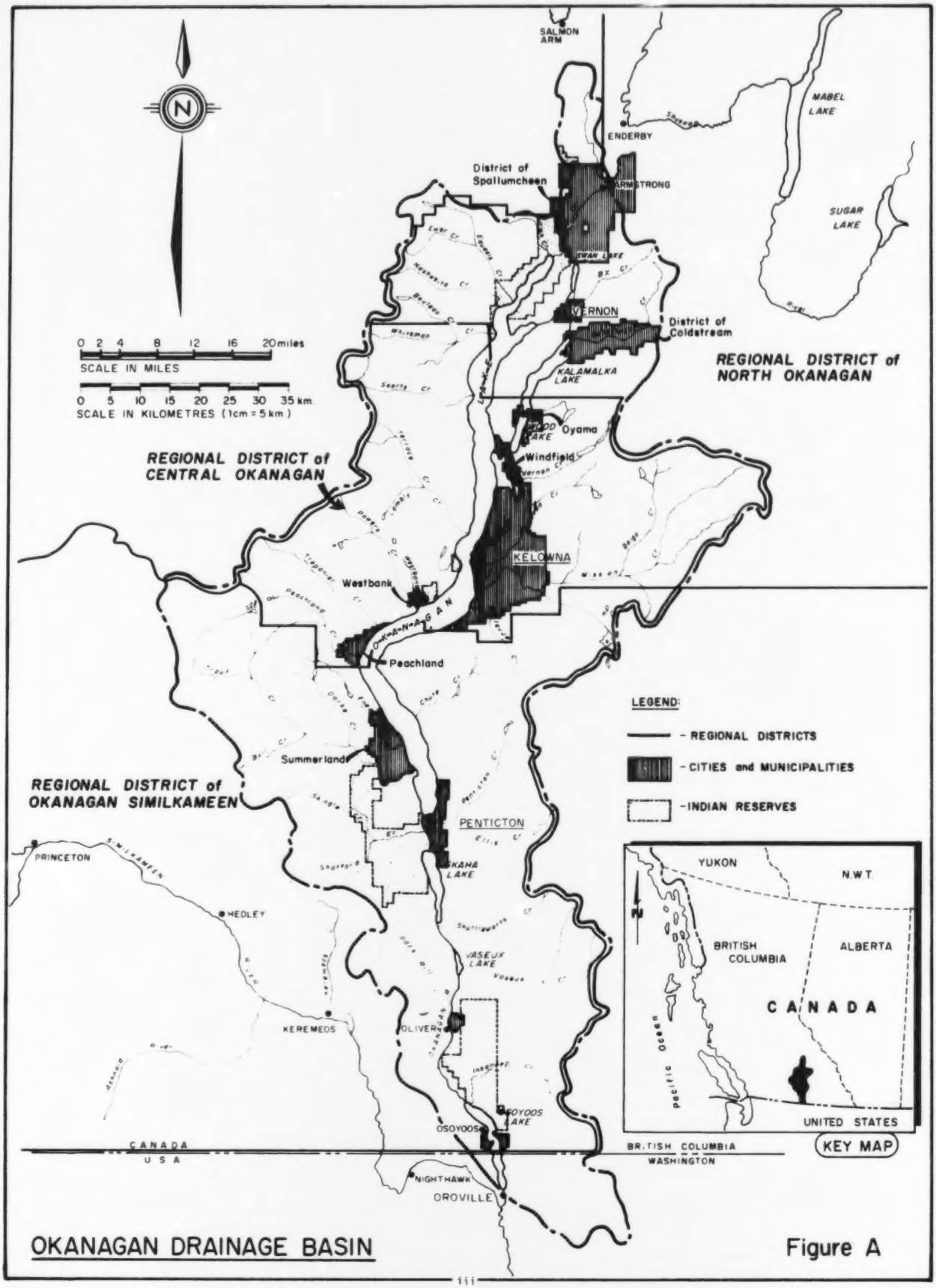
- Economic Growth ... 2
- Water Use ... 2
- Water Quality ... 3
- Demand for Sport Fishing ... 4
- Demand for Water-Based Recreation ... 4

Statement on Public Preferences and Attitudes on Water Management in 1981 ... 5

Recommendations for Ongoing Management ... 7

- General ... 9
- Water Quantity ... 17
- Water Quality ... 23
- Fisheries ... 29
- Water-Based Recreation ... 33

Organization Structure (inside back cover) ... 35



OKANAGAN DRAINAGE BASIN

Figure A

INTRODUCTION

A four-year study of water resource management in the Okanagan Basin was completed by the Canada-British Columbia Consultative Board in 1973. This Study formed the basis for a number of recommendations comprising a comprehensive water management plan.

The Okanagan Basin Implementation Agreement executed on February 9, 1976, by the Governments of Canada and British Columbia provided for the implementation of the particulars of the forty-five recommendations comprising the framework plan. The Agreement also provided for bringing the Okanagan Flood Control System up to standard in conjunction with the transfer of these works and their ongoing operation and maintenance costs to British Columbia.

Funding of $5 million for the implementation of the programs, designated as the joint responsibility of Canada and British Columbia, was shared equally between the two governments.

Over the past six and one-half years the terms of reference of the Agreement have been carried out by the Federal-Provincial Okanagan Basin Implementation Board.

Projects involving the improvement and operation of specific works have been substantially implemented. These include: improvements to the Okanagan Flood Control Works and the operation of this system in accordance with a recommended operating plan; the lowering of intakes along Okanagan River to conserve water during drought years; modifications to the Kelowna floating bridge to allow it to operate over the recommended range of lake levels; the incorporation of phosphorus removal facilities at major wastewater treatment plants in the basin; and the construction of artificial enhancement facilities for rainbow trout and kokanee.

Programs involving regulations and guidelines have also been implemented. These include: flood plain zoning regulations; guidelines to minimize nutrient inputs from forest management and agricultural practices; and the development of draft regulations for minimizing the input of nutrients from septic tank systems. However, the Board has not been able to fully assess the response of the resource to some of these programs due either to the time required for a response to occur or the time needed to provide appropriate supporting legislation.

The Agreement also provided for a review of the plan as implemented and recommendations on any further actions that may be deemed necessary subsequent to the termination of the Agreement. The highlights of this review, along with the recommended plan for ongoing management, are included in this publication.

This Summary Report highlights the results reported on in the Report on the Okanagan Basin Implementation Agreement.

HIGHLIGHTS OF THE PLAN REVIEW

Economic Growth

The total population in the Okanagan basin grew from 114,000 in 1971 to 185,000 in 1981, exceeding even the highest projections forecast in the Okanagan Study. This growth rate is expected to continue with a population of 261,000 forecast for 1991. There is no evidence that this growth will be constrained by the availability of land, or economic and social factors.

Agricultural production increased significantly in the seventies and continued growth is anticipated but at slower rates than in the past decade. This growth is due mainly to higher yields from higher density plantings and more intensive livestock production rather than increased acreage.

The number of tourists visiting the Okanagan annually more than doubled between 1970 and 1980, increasing from 485,000 to 1,046,000. An increasing supply of tourist facilities in the basin is expected to attract more tourists during the next decade. Overall, the increase in the numbers of visitors is forecast to be approximately 15% by 1991.

Increases in the retail and services sector of about 4% annually will result from increased population and activities in other sectors. Logging and milling, on the other hand, are expected to decline slightly based on revised allowable annual cut figures provided by the Ministry of Forests. Limitations on industrial land are expected to limit the rate of expansion in the manufacturing sector.

Water Use

There has been an overall reduction in water requirements in the basin since 1970. This reduction may be attributed to: the implementation of measures under the plan to conserve water; improved water use records; and various conservation measures initiated by water managers over the past ten years, including the use of dole valves, water meters and irrigation scheduling.

There has been little change in the amount of irrigated land in the basin since 1970 which still accounts for over 75% of the total consumptive use. Land adjacent to urban centers which has been taken out of production for development purposes has been offset by new areas brought under production. This trend is forecast to continue through 1990.

The use of water for municipal, domestic and industrial purposes is forecast to increase by about 40% by 1990 due to population growth and associated development. However, this still represents only a 1.5% increase in overall water requirements in the basin.

This review of water use in the basin reconfirms the Study finding: "under good water management there is enough water in the basin to supply all projected withdrawals and meet fishery and recreation requirements in the main valley lakes and in tributary sub-basins within the foreseeable future." The small percentage of total water requirements in the basin that is consumed or lost through municipal and domestic use is the main reason for the lack of sensitivity of water use to population growth.

Water Quality

There has been little measureable change in the quality of any of the main valley lakes since 1970. While a great deal more is known based on monitoring programs carried out over the past five years, this time frame is still far too short in respect to hydrologic variability and changing external influences to indicate any major trend in the quality of each of these lakes.

Wood Lake is classed as mildly eutrophic and has shown some improvement in water clarity over the past few years. This lake is considered to be at the threshold level of phosphorus concentration and any further increase may lead to an abrupt and substantial deterioration in lake quality.

Both Kalamalka and Okanagan Lake still exhibit comparatively good water quality, although occasional algal blooms and some weed growth are evident in shoreline areas.

Skaha Lake water quality has improved slightly since 1970. This improvement is considered due to the removal of phosphorus by the City of Penticton since 1973, although the degree of this improvement is not necessarily proportional to the overall reduction in phosphorus to this lake.

There has been little change in the water quality of Osoyoos Lake. The short residence time of water in both Skaha and Osoyoos Lakes combined with changing amounts of runoff from year to year have obscured any trends in water quality to date.

The review has reconfirmed the Study finding that the nutrient phosphorus is the element to control in order to maintain or improve lake quality for recreational purposes. Since 1970 the overall phosphorus loading from municipal waste treatment plant discharges has been reduced by 60% through the implementation of phosphorus removal facilities. By 1990 approximately 80% of the phosphorus will have been removed from municipal discharges compared to 1970, following the completion of phosphorus removal facilities at Kelowna and Oliver, and assuming at least 90% phosphorus removal at the remaining centers.

Measures have been initiated to reduce phosphorus loadings from non-point sources such as septic tanks, agriculture and forestry practices but these have not reduced overall loadings from this source due, in part, to the rapid population growth over the past decade. Loadings from these sources are

projected to continue to increase through 1990 for most areas of the basin, and a concerted effort will be required to minimize the transport of these loadings to surface waters.

The majority of lakes and streams continued to provide an acceptable quality of water for consumptive and non-consumptive uses. Generally, those lakes and streams with quality problems in 1970 still exhibited the same problems in 1980.

Demand for Sport Fishing

There has been a threefold increase in angling in the headwater lakes since 1970 and the harvest capacity of these lakes is now near optimum based on existing levels of management resources and technology. Most new demands for angling through 1990 will, therefore, have to be provided by the main valley lakes.

Angling effort on the main valley lakes has increased by about 40% since 1971 with Okanagan Lake continuing to support most of this demand.

Projected demands to 1991 are for a continued increase in angler demand corresponding to increases in the Basin's population.

Angler preferences in 1980 were for fewer fish of a larger size as compared to more fish of a smaller size. Rainbow trout were the type of fish most sought by anglers.

Headwater lake anglers also favoured limiting the size of outboard motors, restricting gear to artificial flies and banning ice fishing.

Demand for Water-Based Recreation

The demand for water-based recreation in 1980 has exceeded that projected in 1970 by a considerable amount and this trend is forecast to continue through 1990. The total number of days spent on the beach by residents and tourists in 1980 was 7.15 million compared to 3.9 million in 1970. The demand for beach days in 1990 is forecast to exceed 9 million.

The origin of tourists found in each region in 1980 remains much as it was in 1970. The favourite activities of visitors were also much the same with swimming being the first choice followed closely by sunbathing.

Beach users were less satisfied with water quality in 1980 than they were in 1970 and residents were generally less satisfied with this aspect than tourists.

The most attractive feature of Okanagan beaches to residents in 1980 was simple, quick access from home. Visitors ranked safety, good beach quality and easy access as the most attractive features. Unattractive features included aquatic weeds and inadequate parking facilities.

STATEMENT ON PUBLIC PREFERENCES AND ATTITUDES ON WATER MANAGEMENT IN 1981

Public comment on water management was obtained through a representative Public Task Force which periodically presented their views on water management issues to the Implementation Board, and through a survey carried out in 1981 on public opinions and attitudes concerning various water resource issues. The results of the public survey generally supported the views expressed by the Public Task Force.

Respondents to the survey recognized the importance of balancing economic growth against environmental quality but were uncertain about which forms of growth to sacrifice in order to maintain or enhance environmental quality. Complaints about growth and its benefits were evenly balanced by an unwillingness to forego its benefits.

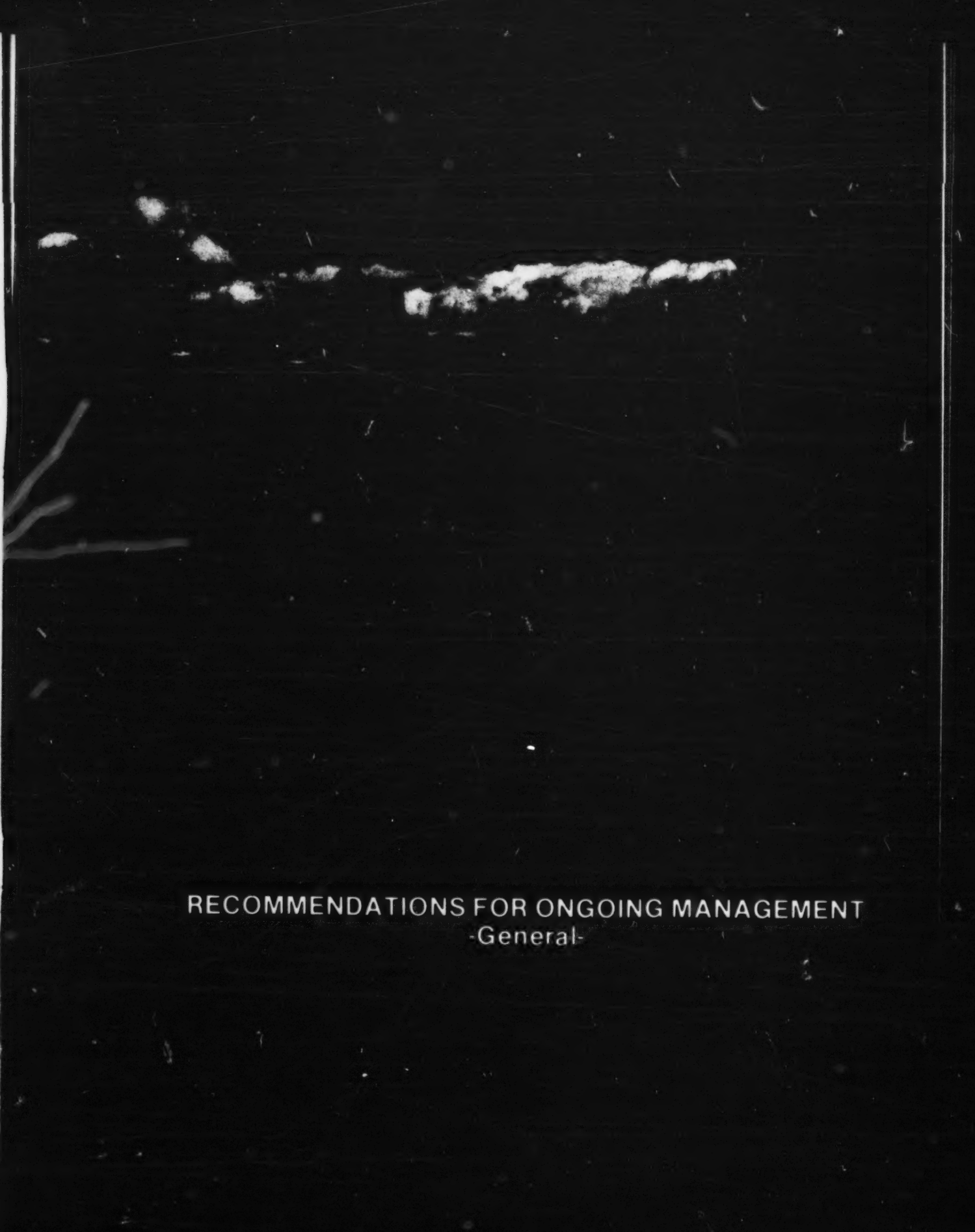
The Public Task Force in their final report on the Implementation Program were highly critical of the failure of government to establish a single management jurisdiction for water in the basin as recommended in the comprehensive framework plan. Respondents to the public opinion and attitude survey also ranked this issue as a major management problem area but with a much lower level of support than that given by the Public Task Force.

Both the Public Task Force and survey respondents strongly supported the preservation of acreage within the Agricultural Land Reserve.

There was general agreement between the Task Force and survey results concerning support for higher standards of water quality, although the Task Force expectations were much higher than those of the survey respondents. Both groups felt these higher water quality standards could be achieved through more stringent enforcement of existing regulations rather than by imposing new standards on specific groups such as industry, households, agriculture and forestry.

Residents surveyed considered existing recreational facilities in the basin adequate but felt that continuing growth would necessitate the development of additional facilities. The Public Task Force were somewhat more critical of the availability of facilities than were public respondents.

About 50% of those residents surveyed go sport fishing in either the headwater or main valley lakes. Even those who did not fish felt that there were aesthetic benefits from maintaining this water related resource. These views were supported even more strongly by the Public Task Force.



RECOMMENDATIONS FOR ONGOING MANAGEMENT

-General-

RECOMMENDATIONS FOR ONGOING MANAGEMENT
-General-

The original framework plan consisted of eleven basic recommendations and thirty-four detailed recommendations. Under the Implementation Agreement the "Particulars" of these recommendations have been substantially implemented. Based on a review of this implemented plan in 1980 and 1981 the Implementation Board recommends the implementation of the following 25 recommendations which comprise the plan for the ongoing management of water and water-related resources in the Okanagan Basin. Under this ongoing plan the basic recommendations concerning water quantity, water quality, fisheries and water-based recreation are included as part of the component recommendations under these subheadings. The remaining basic recommendations have been termed as general or applicable to all component recommendations.

Coordination and Management of Plan

The Implementation Board examined three questions concerning the need and role of various groups and agencies in the coordination and management of the ongoing plan for water management in the basin. The first of these concerned the establishment of a "Resource Authority" for the basin as recommended by the Public Task Force. The second question concerned the continuing role of local government in managing functions that pertain to the basin as a whole. The third question concerned whether the expanded role of Regional Offices of Provincial Resource Ministries meets the concept and needs for the overall coordination and management of the recommended ongoing plan.

With regard to the first question, the Public Task Force in their final report on the Implementation Program were highly critical of the failure of government to establish a single management jurisdiction for water in the basin as set out in the recommendations of the Okanagan Basin Study. Respondents to the public opinion and attitude survey also ranked this issue as a major management problem area but with a much lower level of support than that given by the Task Force. While the Implementation Board acknowledged these concerns it agreed that the establishment of another authority or level of government was not considered practical or desirable, and that more acceptable management alternatives were available.

On the second question, the original draft plan called for one regional district, the boundaries of which would be the same as that of the Okanagan Basin for managing water and water-related resources at the local level. Specifically, the functions noted that are Valley-wide in scope were waste treatment, the orderly development of shoreline recreation facilities and flood plain zoning. This approach was subsequently modified to meet the concerns of elected representatives of the three Regional Districts such that the Okanagan Basin Water Board were given authority to carry out a coordinating role and the Regional District boundaries remained unchanged.

In reviewing this aspect of the Study Plan, the Implementation Board was not able to identify a continuing role for the Okanagan Basin Water Board in the ongoing coordination of the plan. The Implementation Board notes, however, that it has limited ability to assess the value of the Water Board in this coordinating role. The Regional Districts, therefore, should assess the need and value of the Okanagan Basin Water Board in coordinating those functions of the ongoing plan which are designated as the responsibility of the Regional Districts and Municipalities in the basin.

The third question addressed by the Board concerned whether the expanded Regional role of the Provincial Resource Ministries will meet the needs of overall coordination and management of the ongoing plan. Legislation within the jurisdiction of these Ministries has been changed, during the implementation of the Study Plan, to reflect a policy of coordination in the planning, use and management of resources.

The Board has been advised that the Ministry of Forests, the Ministry of Agriculture and Food, and the Ministry of Lands, Parks and Housing have undergone reorganization to implement new legislation. The Ministry of Environment in particular has undergone a substantial reorganization to bring together under a single regional administration, programs involving water management, waste management, fisheries management, wildlife management, pesticide control, air management and emergency measures. These programs, supported by new and revised legislation, are being implemented through Regional Offices and include public information, planning and enforcement services. This reorganization has resulted in the regionalization of authority and decision making, and has promoted integrated resource planning and management.

The focus of the reorganized Ministry of Environment is to integrate the management of those resources for which it is responsible in concert with other resource Ministries, particularly the Ministries of Forests, Lands, Parks and Housing, Petroleum and Mineral Resources and Agriculture and Food. In fulfilling this role there is also close cooperation with Provincial Service Ministries such as Highways and Transportation, Municipal Affairs and Health, as well as various agencies of the Government of Canada and local municipal governments.

The Board also recognizes that administrative and planning processes have been established by British Columbia to promote the coordination and integration of resource management. These are:

(i) The Interagency Referral System

This reciprocal process permits Provincial Ministries, as well as Federal and local agencies to solicit comments and recommendations from other agencies to achieve an integrated and consultative approach to the multiple use of resources and to resolve potential resource use conflicts.

(ii) Coordinated Resource Management Planning

This process brings together at a local level the resource users and resource managers. It resolves use conflicts through formulation and implementation of plans primarily concerned with forestry, agriculture, fisheries, wildlife and water resources. Funding for specific enhancement measures has been provided under a Federal-Provincial Agreement.

(iii) Strategic Planning

This process represents the formal planning now underway by several Ministries. In particular the Ministry of Environment is preparing a series of strategic plans for major drainage basins which will include the Okanagan basin. These plans will be reviewed every five years and will establish the objectives and standards for water resource management in the basin together with those related resources for which the Ministry is responsible. This system of planning will include review by other agencies as well as public participation in the preparation of the plan.

(iv) Regional Resource Management Committees

These Committees have been established in seven regions of the Province and are part of the organizational policy of the Environment and Land Use Committee of the Provincial Cabinet. Meetings are attended by senior regional resource agency staff who are responsible to a technical committee of Deputy Ministers. The role of the Committee is to assist in plan preparation, to coordinate programs, to review impact assessments, and to implement policies in the land use and resource management field.

The Regional Resource Management Committee for the Okanagan basin is grouped with the Thompson basin with headquarters in Kamloops. The Ministry of Environment has established a regional headquarters in Penticton to implement its programs. The Ministry of Agriculture and Food also have a regional headquarters in the Okanagan Valley while most other Ministries maintain district offices in the Valley with regional headquarters in Kamloops.

The Implementation Board acknowledges that the regionalization of authority by the resource agencies, along with the development of processes for coordinating and integrating resource management at the regional level, provides a far better basis for coordinating and managing the recommended ongong plan for water management in the basin than has been previously available. The Board concludes, however, that the Resource Management Committee as established for the Thompson-Okanagan area with its headquarters in Kamloops may not effectively service the special needs of the ongoing plan and that a separate Resource Management Group should be established for and located in the Okanagan basin. The Implementation Board, therefore recommends:

Coordination and Management of Plan

1. (a) That the Province of British Columbia, through its Ministry of Environment, carry out or cause to be carried out all management functions as set out in these 25 recommendations comprising the plan for the ongoing management of water and water-related resources in the Okanagan Basin by:

(i) being responsible for carrying out or causing to be carried out the recommendations comprising the plan for ongoing management;

(ii) serving as the lead group for the coordination of the many planning activities which affect regional water use;

(iii) keeping up-to-date the implemented plan for water and related resource development in the basin;

(iv) recommending long and short term priorities for the collection, analysis and evaluation of basic data necessary for the practice of good water management in the basin;

(v) fostering and coordinating studies of water and related resource problems deemed necessary to the maintenance and/or revision of the plan;

(vi) providing for liaison with local government and public consultation on management issues and concerns;

(vii) providing for liaison with the federal government on water management issues where there are federal interests or jurisdiction;

(b) That the Province of British Columbia establish a Resource Management Group, similar in structure and function to the Regional Resource Management Committee, for and located in the Okanagan basin.

The Implementation Board considers that these arrangements would provide the focus necessary to provide a common approach to integrated water management in the basin while still allowing local, regional and senior government agencies to carry out their management functions as an integral part of the Plan.

Review of Ongoing Plan

The Implementation Agreement provided for a review of the framework plan to ensure that the plan continued to meet the social and economic goals of the Valley community. The Implementation Board considers that such reviews should be part of any ongoing management plan, particularly in view of the rapid population growth that is presently taking place in the basin and, also, due to changing technology. These reviews should coincide with those which the Ministry of Environment undertakes on a five-year interval for its strategic plans. The Implementation Board, therfore, recommends:

Review of Plan

2. "That the ongoing plan for water management in the basin be reviewed every five years to ensure that the plan continues to meet the social and economic goals of the Valley community."

Ongoing Monitoring Program

Ongoing hydrometric and water quality monitoring programs are an essential component of the ongoing plan for water management in the basin. These programs provide information on inflow forecasts for managing the Okanagan Lake Flood Control system, for determining water availability in tributary basins, for monitoring minimum flows for fisheries in Mission, Powers and Equesis Creeks, and for water quality management purposes. The Implementation Board, therefore, recommends:

Ongoing Monitoring

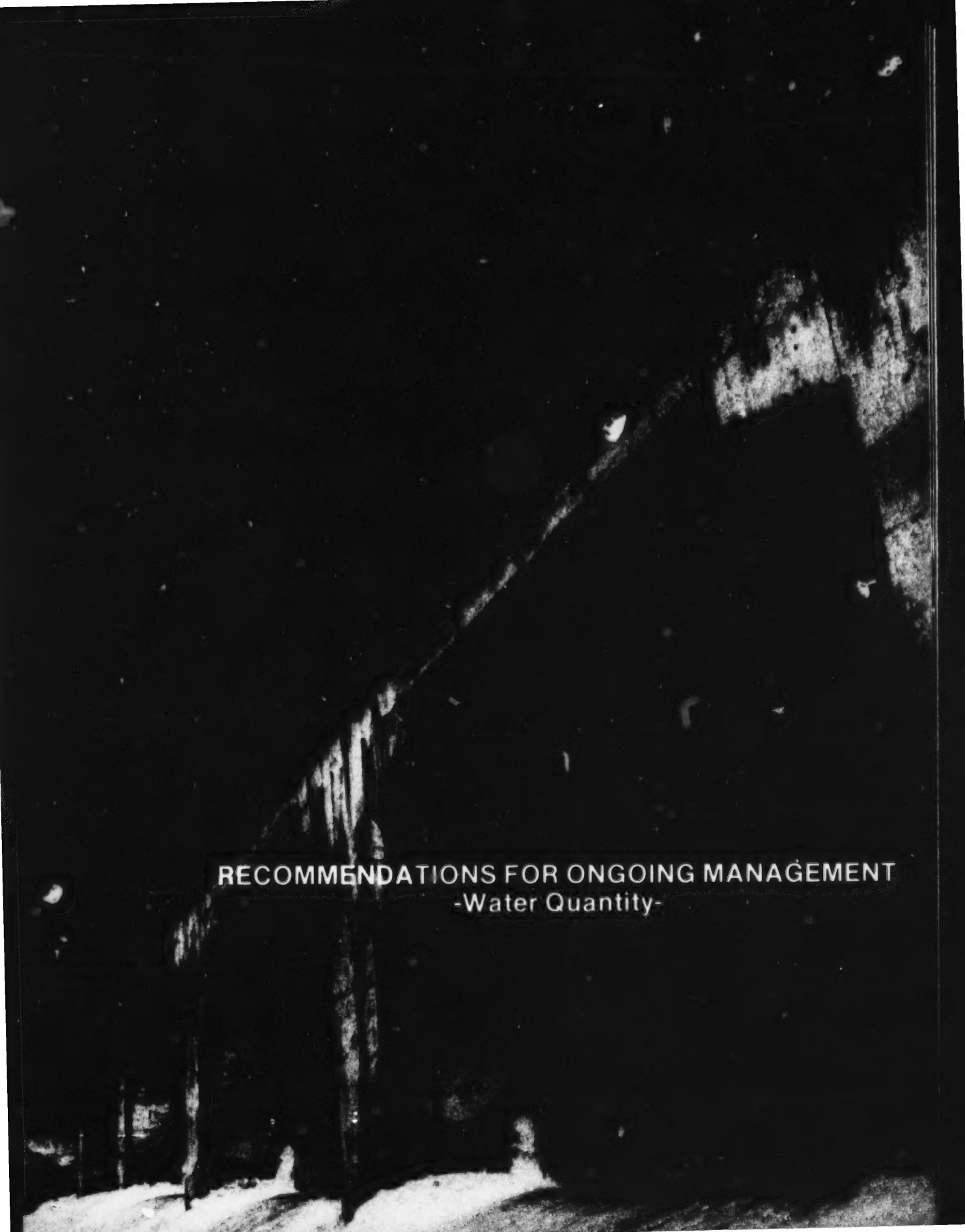
3. "That the hydrometric and water quality monitoring program as set out in the "Report on the Okanagan Basin Implementation Agreement" be continued or established."

Indian Lands

The 1974 Okanagan Study identified certain deficiences in the legal and institutional aspects of water resource management in the Okanagan which have hindered effective planning and management. One of these concerned Indian lands and states: "No one agency is empowered to enforce waste management, flood plain zoning and green belt measures recommended under the framework plan on all Indian lands in the Okanagan." The Department of Indian Affairs and Northern Development now has procedures whereby new developments on Indian lands are screened to comply with local regulations and federal environmental standards. However, land use and waste management on existing leases remain largely uncontrolled. The Implementation Board, therefore, recommends:

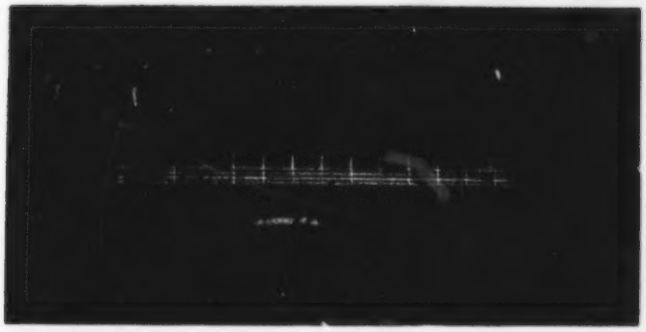
Indian Lands

4. That the Department of Indian Affairs and Northern Development encourage Indian Bands to adopt the recommendations for ongoing management on all Indian lands within the Okanagan Basin."



RECOMMENDATIONS FOR ONGOING MANAGEMENT

-Water Quantity-



RECOMMENDATIONS FOR ONGOING MANAGEMENT
-Water Quantity-

Operation Okanagan Flood Control System

5. That the mainstem system be operated by the Ministry of Environment, British Columbia, in accordance with the operating plan as set out in the Report on the Okanagan Basin Implementation Agreement. In summary, this states that the available water be managed to meet existing and projected needs and uses around Okanagan Lake and along Okanagan River as follows:

   (i) Okanagan Lake will be regulated within its normal range of 341.3 metres to 342.5 metres (1119.8 feet to 1123.8 feet) in all but anticipated extreme flood years and successive drought years;

   (ii) in anticipation of very high volume runoff (forecast freshet volume to Okanagan Lake greater than 617 million cubic metres), the lake may be drawn down by up to 0.3 metres below its normal low water level. When extremely high volume runoff occurs, Okanagan Lake may unavoidably exceed its normal upper level;

   (iii) under prolonged drought conditions (a number of successive years with inflows less than 247 million cubic metres) Okanagan Lake may be drawn down below its normal low water level by up to 0.9 metres (to elevation 340.4 metres) to provide water for consumptive and non-consumptive uses. In two or more consecutive drought years flows for non-consumptive uses such as fisheries may have to be reduced;

   (iv) to enhance shore spawning kokanee conditions over the fall and winter months, Okanagan Lake will be regulated such that, when possible, the lake level is not greater than 341.9 metres on October 15, subject to flow restrictions for sockeye salmon;

   (v) water requirements for sockeye salmon in Okanagan River will be met in all years except consecutive drought years as follows:

Period	Flows Measured at Oliver Hydrometric Station
Migration (approx. Aug. 1 to Sept. 15)	*8.5 - 28.3 cubic metres per second*
Spawning periods (approx. Sept. 16 to Oct. 31)	*9.9 - 15.6 cubic metres per second*
Incubation and emergence period (approx. Nov. 1 to Apr. 30)	*5.0 - 28.3 cubic metres per second but not less than 50% of Sept. 16 to Oct. 31 inflow.*

Operation Kalamalka-Wood Lake System

6. That the Kalamalka-Wood Lake system be operated by the Ministry of Environment, British Columbia, in accordance with the following guidelines:

   (i) in normal runoff years the level of the lakes will be maintained within its normal range of 391.0 metres to 391.65 metres. In extremely high runoff years (1:200 frequency) this normal upper level may be exceeded;

   (ii) under prolonged drought conditions the level of these lakes may fall 0.4 metres below the normal low water elevation (to elevation 390.6 metres), recognizing that all consumptive and essential non-consumptive water requirements should be met;

   (iii) the requirements of shore spawning kokanee and lake trout be accommodated as far as possible in the autumn and winter regulation of lake levels.

Flood Plain Zoning

7. That the Ministry of Environment, British Columbia encourage Regional Districts and Municipalities in the basin to implement, maintain and enforce flood plain zoning regulations which state that "no dwelling shall be constructed nor mobile home located:

   (i) within eight metres (25 feet) of the natural boundary of a lake or on land within 30.5 metres of Okanagan River or where the elevation of the land is lower than 1.5 metres above the design flow of the river; and

(ii) with the underside of the floor system of the building below the following elevations or without floodproofing below the following elevations:

Kalamalka and Wood Lake	***393.2 metres (1,290.0 feet)***
Okanagan Lake	***343.6 metres (1,127.5 feet)***
Skaha Lake	***339.2 metres (1,113.0 feet)***
Osoyoos Lake	***280.7 metres (921.0 feet).''***

Use of land falling within these flood plain zones should conform with established Provincial guidelines.

Water Intake Structural Requirements

8. That the Ministry of Environment, British Columbia, advise potential licensees requiring to divert water from Kalamalka, Okanagan and Osoyoos Lakes, or licensees where applications are being made to modify existing intakes, that the level of these lakes may fluctuate over the following ranges and that all new or modified intakes are to be constructed to operate effectively over these ranges:

Kalamalka Lake	***390.7 metres to 391.8 metres;***
Okanagan Lake	***340.4 metres to 343.0 metres;***
Osoyoos Lake	***277.0 metres to 280.1 metres.***

Wharves and Boat Ramp Structural Requirements

9. That British Columbia recommend to Transport Canada and the Ministry of Lands, Parks and Housing, British Columbia, that they inform all applicants applying to construct wharves, boat ramps and other structures around Kalamalka, Okanagan and Osoyoos Lakes, or where modifications are to be made to existing structures, that the level of these lakes may fluctuate over the following ranges, and that any such structures be built or existing structures modified to effectively accommodate these ranges of lake elevation:

Kalamalka Lake	***390.7 metres to 391.8 metres;***
Okanagan Lake	***340.3 metres to 343.0 metres;***
Osoyoos Lake	***277.0 metres to 280.1 metres.***

Tributary Management

10. That the Ministry of Environment, British Columbia manage tributary basins in accordance with the following guidelines:

(i) subject to the priority rights of existing water licences stream flows will be regulated with due cognizance of quantified fishery needs;

(ii) where necessary for fisheries conservation purposes applications will be initiated for supplementary storage licences;

(iii) specific applications will be initiated for supplementary storage licences for fisheries conservation purposes as follows:

Mission creek (minimum desirable instream flow (1.13 cubic metres per second)

- 1.85 million cubic metres in Loch Long,
- 2.28 million cubic metres in Mission Lake,
- 2.74 million cubic metres in Fish Hawk Lake (Stage 2);

Powers Creek (minimum desirable instream flow 0.14 cubic metres per second)

- 3.7 million cubic metres in proposed mainstem site;

Equesis Creek (minimum desirable instream flow 0.28 cubic metres per second)

- 0.86 million cubic metres on Pinaus Lake;

(iv) in cooperation with the Irrigation Districts involved to develop and put into place an approved operational plan for managing Mission, Powers and Equesis Creeks primarily to meet irrigation and fishery needs;

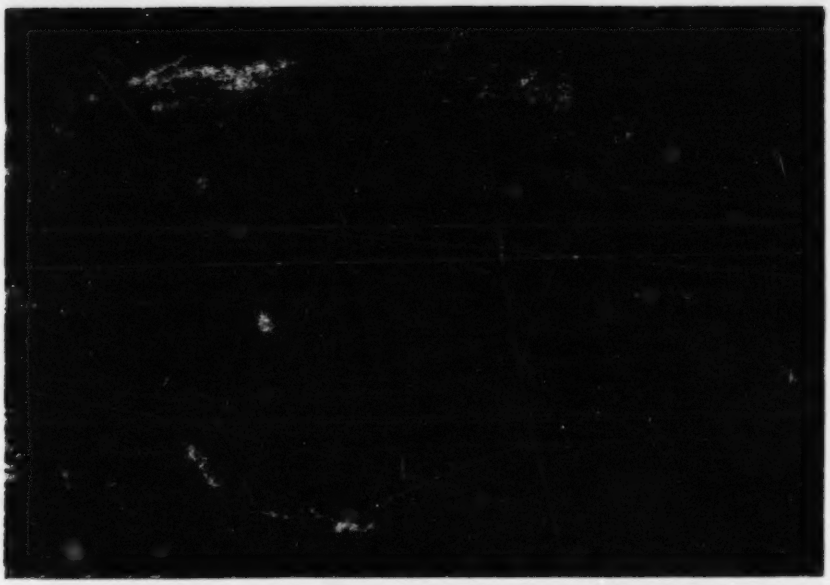
(v) to continue to carry out studies of water availability in tributary basins, and to improve on the reliability of such information based on data from the hydrometric monitoring program set out in the Report on the Okanagan Basin Implementation Agreement.

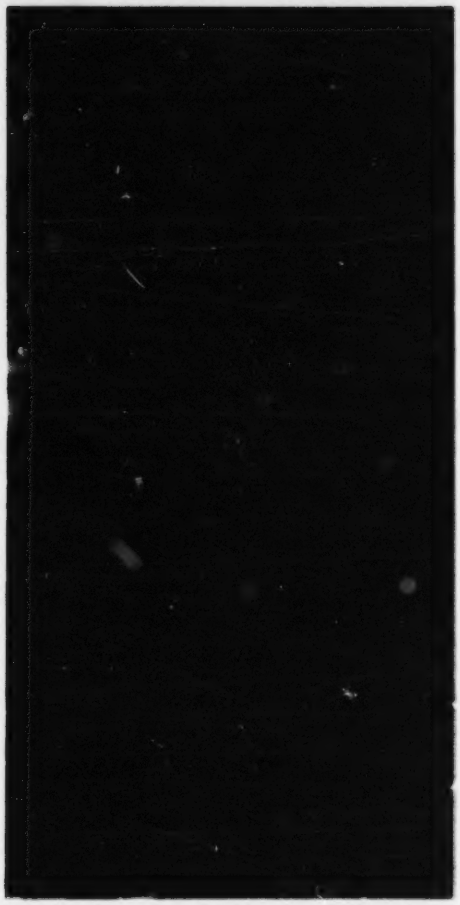
Pump Diversion to Vernon Creek

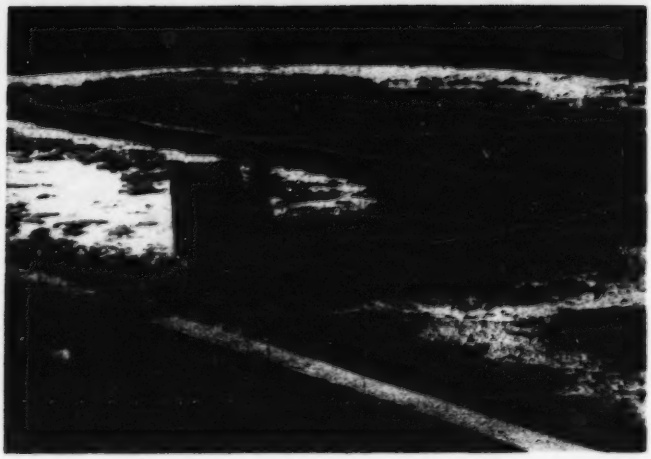
11. That no action be taken to increase the amount or permanency of the existing diversion of water from Okanagan Lake to the Kalamalka-Wood Lake system, if it can be shown that such implementation will adversely affect the water quality of either Wood or Kalamalka Lakes.

RECOMMENDATIONS FOR ONGOING MANAGEMENT

-Water Quality-







RECOMMENDATIONS FOR ONGOING MANAGEMENT
-Water Quality-

Municipal and Industrial Discharges to Tributaries

12. That the Ministry of Environment, British Columbia continue to prevent all municipal and industrial waste discharges causing pollution from entering tributary streams.

Phosphorus Removal from Wastewater Treatment Plants

13. That the Ministry of Environment, British Columbia, continue to require Regional Districts, Municipalities and private developers in the basin to reduce phosphorus loadings from domestic and industrial waste discharges to the main valley lakes through appropriate waste management programs. Based on current technology and 1981 estimates of loadings from this source the desirable level of phosphorus removal at all centers for ongoing management purposes should be 90%. Specifically:

(i) phosphorus removal at the centers of Vernon, Coldstream, Penticton, Okanagan Falls and Osoyoos should be continued;

(ii) facilities for the removal of phosphorus at Armstrong, Kelowna, Westbank and Oliver should be completed by 1984 and phosphorus removal initiated and maintained;

(iii) that sewage collection and treatment for the urban center of Winfield, with facilities for at least 90% phosphorus removal, be implemented by 1985;

(iv) that sewage collection and treatment with at least 90% phosphorus removal for the urban center of Okanagan Landing be implemented by 1986 to reduce loadings to the Vernon Arm of the lake;

(v) facilities for the removal of phosphorus at other shoreline communities around the main valley lakes to be implemented as required to improve water quality in local shoreline areas.

Septic Tank Regulations and Inspections

14. That the Ministry of Environment and the Ministry of Municipal Affairs, British Columbia, jointly expedite provision of a formal mechanism and encourage the Regional Districts and Municipalities in the basin to implement:

(i) the recommended septic tank regulations set out in the Report on the Implementation Agreement for all new septic tank installations where soil and other conditions are such that special measures are required to control phosphorus from this source;

In addition a program of inspection for septic tank installations in the basin should be developed. Where installations do not conform to Provincial Standards the owner would be required to bring these up to standard.

Agricultural Practices

15. That the Ministry of Agriculture and Food, British Columbia continue to promote and, in cooperation with other agencies, implement a program of agricultural management practices which will reduce phosphorus loadings to the main valley lakes. Specifically, this program will include, but not be limited to:

(i) restricting access of livestock to water courses in intensive use livestock areas;

(ii) preventing livestock wastes from entering water courses in intensive use livestock areas;

(iii) improving methods of fertilizer application and knowledge concerning the type and optimum amount of fertilizer to be applied to crops to minimize the transport of phosphorus to the lake system through runoff and percolation;

(iv) improving conservation practices to minimize the erosion of soil from agricultural lands;

(v) assisting other agencies in the recyling of waste materials for food production.

The Ministry of Environment in concert with the Ministry of Agriculture and Food would monitor and evaluate the effect of measures implemented in accordance with these agricultural environmental guidelines and where these guidelines are not being met would initiate appropriate actions under existing enforcement mechanisms.

Forestry Activities

16. That the Ministry of Forests, British Columbia, continue to promote and implement a program of forestry management practices which will reduce phosphorus loadings to the main valley lakes. Specifically, this program will include, but not be limited to:

(i) the planning and construction of forestry roads adjacent to or crossing tributary streams in a manner that would minimize erosion from such activities, particularly during freshet and storm events;

(ii) the planning and control of logging activities such that they recognize the sensitivity of various regions and soil types to erosion, including the impact of logging on hydrology and resultant stream channel erosion;

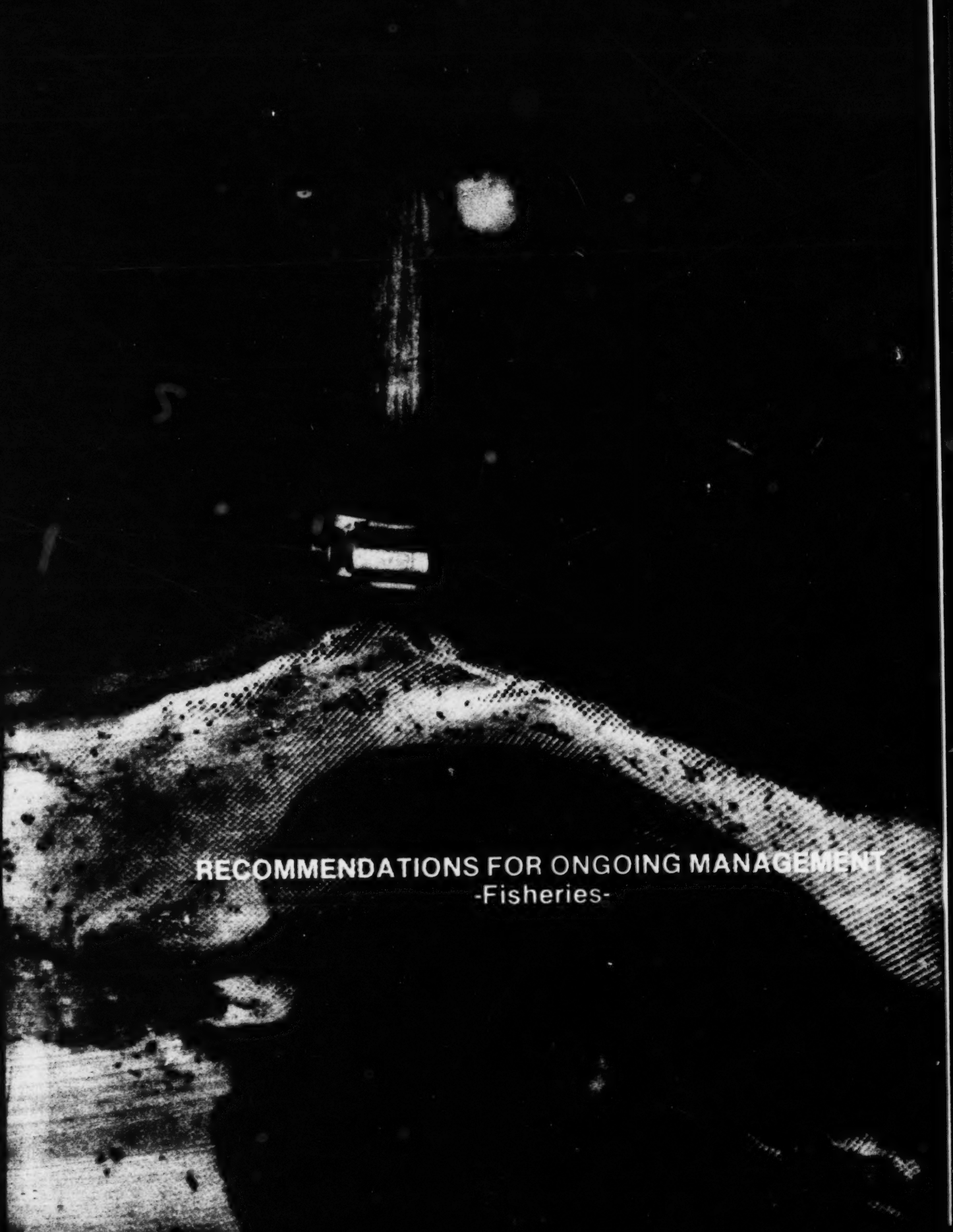
(iii) the use of special management zones along streams, particularly in erosion sensitive areas to minimize the amount of sediment, from logging and other forestry activities, from reaching the stream course;

(iv) the promotion of information and educational programs within the Ministry of Forests to increase the level of awareness of those responsible for logging operations, with respect to forestry management guidelines and recommended practices.

The Ministry of Environment in concert with the Ministry of Forests would monitor and evaluate the effect of measures implemented in accordance with these environmental guidelines, and where these guidelines are not being met would initiate appropriate action under existing enforcement mechanisms.

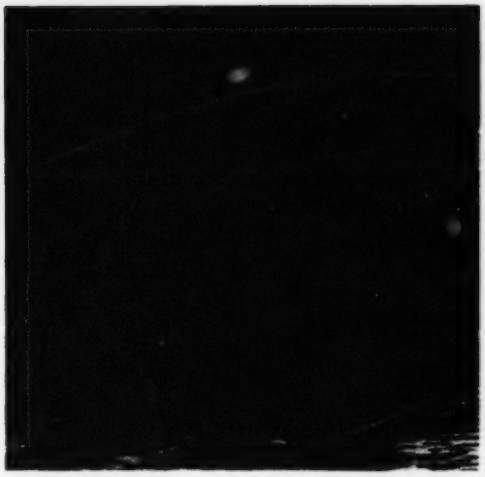
Pesticides and Sprays

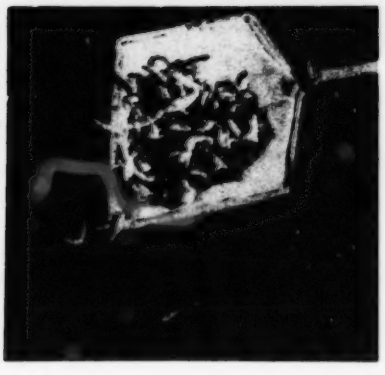
17. That the Ministry of Environment, British Columbia, continue to ensure that the sale and use of pesticides and sprays in the Okanagan basin is carried out in a responsible and knowledgeable manner, that adequate consideration is given to environmental and public health concerns when pesticide use decisions are made, and that pesticide use programs are monitored.



RECOMMENDATIONS FOR ONGOING MANAGEMENT

-Fisheries-





RECOMMENDATIONS FOR ONGOING MANAGEMENT
-Fisheries-

Management

18. That the Ministry of Environment continue to manage the fishery resource on a basin-wide basis through:

    (i) improving the headwater lake fishery by regulating selected lakes for special types of fishing and seasonal use, carefully matching stocking with lake capability and fishery goals, maintaining records of angler use, catch success, total harvest, fish growth, program cost and benefits, publicizing angling opportunities in under-utilized lakes, identifying and implementing additional opportunities for enhancing this fishery through the aeration and chemical rehabilitation of lakes, stream spawning restoration and other habitat manipluations;

    (ii) improving the main valley lake fishery by monitoring and evaluating the response of natural and artificial enhancement measures implemented under this Agreement, developing new facilities and rehabilitating existing habitat to meet increasing angling demands, publicizing utilization of other sport fish such as cod and whitefish, and carrying out periodic reviews of artificial enhancement methods based on cost-benefit studies and changing technology.

Headwater Lake Stocking Program

19. That the Ministry of Environment, British Columbia, strive to maintain the present stocking rate of 3.7 million fry equivalent fish on a continuous basis. Special fish stocks and sizes may necessitate the use of a variety of hatcheries to service the needs of the Okanagan headwater lakes and this need will be recognized when planning future hatchery needs and capabilities.

Natural Habitat Enhancement Main Valley Lakes

20. That the Ministry of Environment, British Columbia, ensure that the water available for fishery enhancement in Mission, Powers and Equesis Creeks be provided in accordance with Recommendation 10 and that the beds in these three streams continue to be rehabilitated and/or maintained to maximize reproduction from this natural spawning habitat.

Artificial Enhancement Main Valley Lakes

21. That the Ministry of Environment, British Columbia, continue to maintain and operate existing artificial enhancement facilities and to develop new enhancement facilities which, in conjunction with the enhancement of natural habitat will provide acceptable catch success rates of kokanee and rainbow trout in the main valley lakes (Kalamalka, Wood, Okanagan, Skaha and Osoyoos).

Shore Spawning Kokanee

22. (i) That the Ministry of Environment, British Columbia, minimize the drawdown of Okanagan Lake in the winter months to optimize natural reproduction of shore spawning kokanee in accordance with the operating guidelines for the mainstem system.

(ii) That the Ministry of Lands, Parks and Housing, British Columbia, continue to protect key identified kokanee shore spawning areas on the main valley lakes from alienation and development.

RECOMMENDATIONS FOR ON
-Water-Based Re

RECOMMENDATIONS FOR ONGOING MANAGEMENT
-Water-Based Recreation-

Management and Regulatory Action

23. That the Ministry of Lands, Parks and Housing, British Columbia, provide the direction and coordination necessary for the management and development of shoreline recreation in the Okanagan basin. Specifically, these coordination, development and management functions will include:

(a) liaison with the Regional Districts and Municipalities in the Okanagan basin to ensure common standards of facilities and regulations for recreational planning and management components which fall under the responsibility of the Regional Districts and Municipalities;

(b) collection of recreation and shoreline land use data as required to manage this component of the plan;

(c) a study to determine the most feasible and acceptable method of enforcing regulations which are pertinent to the management of water-based recreation, the implementation of these enforcement policies through existing or new legislation, and the coordination of the enforcement of such regulations as part of the Ministry management role in the basin. The study and implementation of these enforcement policies will be carried out in liaison with the Regional Districts and Municipalities comprising the Okanagan basin;

(d) the coordination of the following shoreline management functions:

(i) boating and other regulations (subject to the implementation of Recommedation 23-c);

(ii) public boat launching facilities;

(iii) public access points.

Beach Water Quality

24. That the Ministry of Health continue monitoring beach water quality to ensure that water quality objectives for water-based recreation are met at all public beaches on the main valley lakes based on the following criteria:

(i) "As determined by multiple-tube fermentation or membrane filter procedure based on a minimum of not less that five (5) samples taken over not more than a 30-day period, the fecal coliform content of primary contact recreation waters shall not exceed a log mean (geometric mean) of 200 colonies per 100 millilitres, nor shall more than 10 percent of total samples (90 percentile point) during any 30-day period exceed 400 colonies per 100 millilitres."

(ii) the water be kept as free as possible from floating debris, scum, weeds, oil slicks and other objectionable material that detract from its quality and appearance.

Alienation of Shorelines

25. That the Ministry of Lands, Parks and Housing continue the imposition of strict constraints on further alienation and encroachment of private use of all remaining public and Crown owned shorelines around the main valley lakes.

ORGANIZATION STRUCTURE
Okanagan Basin Implementation Agreement

	CANADA	BRITISH COLUMBIA
PARTIES	Jean Marchand, Minister of Environment, 1976 Romeo LeBlanc, Minister of Fisheries and the Environment, 1976 - 1977 Len Marchand, Minister of State, (Environment), 1977 - 1979 Len Marchand, Minister of the Environment, 1979 John Fraser, Minister of the Environment, 1979 - 1980 John Roberts, Minister of the Environment, 1980 - 1982	J.A. Nielsen, Minister of Environment, 1976 - 1978 Rafe Mair, Minister of Environment, 1978 - 1979 Stephen Rogers, Minister of Environment, 1979 - 1982
IMPLEMENTATION BOARD	E.M. Clark, Vice-Chairman, 1976 - 1982 Regional Director Pacific and Yukon Region Inland Waters Directorate Environment Canada R.E. McLaren, Member, 1976 - 1977 Regional Director Pacific and Yukon Region Environmental Protection Service Environment Canada B.A. Heskin, Member, 1977 - 1982 Regional Director Pacific and Yukon Region Environmental Protection Service, Environment Canada	G.E. Simmons, Chairman, 1976 - 1981 Assistant Deputy Minister Ministry of Environment T.H. Oxland, Chairman, 1981 - 1982 Regional Director Okanagan Region Ministry of Environment C.H.L. Woodward, Member, 1976 - 1981 Assistant Deputy Minister Ministry of Municipal Affairs T.F. Moore, Member, 1981 - 1982 Assistant Deputy Minister Ministry of Municipal Affairs
ADVISORY COMMITTEE	M.M. Wiggins, Chairman, 1976 - 1982 Chief, Water Planning and Management Branch Pacific and Yukon Region Inland Waters Directorate Environment Canada F.G. Claggett, Member, 1976 - 1982 Manager, Pollution Control Group Pacific Region Environmental Protection Service Environment Canada	T.A.J. Leach, Vice-Chairman, 1976 - 1979 Assistant Director Water Investigations Branch Ministry of Environment S.B. Mould, Vice-Chairman, 1979 - 1980 Engineering and Inventory Branch Ministry of Environment J.D.C. Fuller, Vice-Chairman, 1980 - 1982 Assistant Director Water Management Branch Ministry of Environment T.F. Moore, Member, 1976 - 1981 Executive Director Administrative Services Ministry of Municipal Affairs and Housing W.A. Kastelen, Member, 1979 - 1980 District Engineer Pollution Control Branch Ministry of Environment R.A. Nickel, Member, 1980 - 1982 Regional Waste Manager, Okanagan Region, Ministry of Environment

IMPLEMENTATION SUPPORT STAFF	A.M. Thomson	- Program Coordinator
	S.B. Mould	- Coordination, Water Quantity Programs, 1976 - 1980
	J.D.C. Fuller	- Coordination, Water Quantity Programs, 1980 - 1982
	A. Brown	- Water Quantity Programs
	B. Letvak	- Water Quantity Programs
	R. Wadden	- Water Quantity Programs
	D.G. Alexander	- Coordination, Water Quality, Fisheries & Recreation Programs
	G.L. Punnet	- Public Information Program
	J. Ostoforov	- Draughtsman
	M. Moccia	- Stenographic and Clerical Services